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INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2010 Survey Report

Lake Winnsboro

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Lake Winnsboro were surveyed in 2010 using electrofishing and trap netting and in 2011 using gill netting. Aquatic vegetation and habitat surveys were conducted on Lake Winnsboro during July 2010. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir description:** Lake Winnsboro is a 1,100-acre impoundment located in Wood County, Texas on Big Sandy Creek, a tributary of the Sabine River. It was constructed by Wood County for flood control and recreation. The majority of the lake's perimeter is natural shoreline, and the major aquatic habitat components are native emergent aquatic species and boat docks and piers. Less than 5% of the shoreline is modified with bulkhead or rocky shoreline.

- **Management history:** Important sport fish include largemouth bass, white crappie, black crappie, and channel catfish. The management plan from the 2006 survey report recommended monitoring the Florida largemouth fishery through biennial electrofishing, conducting genetic analysis to assess Florida largemouth bass allele frequencies, conducting trap netting in 2010 to assess crappie populations, and promoting the lake's fisheries resources. Florida largemouth bass were stocked in 1998 and 1999.

- **Fish community**
  - **Prey species:** Electrofishing catch rates of gizzard shad and bluegill were higher than in the past. Both populations were dominated by individuals less than 5 inches in length. Few redear sunfish were collected. Threadfin shad provided additional forage for sport fish in the reservoir. The favorable relative weights of the lake's sport fish populations are an indicator of the adequacy of the prey fish populations.

  - **Catfishes:** The channel catfish population is of high quality, and over one quarter of the fish collected were larger than the minimum length limit. There is evidence of good natural recruitment, and relative weights are favorable. No blue or flathead catfish were collected during the 2011 survey.

  - **Largemouth bass:** The largemouth bass population exhibited a favorable size distribution indicating a balanced fish population. Body condition and growth rates were good indicating the adequacy of prey populations.

  - **Crappies:** Crappie catch rates in 2010 were low, and all of the fish collected were of legally harvestable size. Black crappie growth rate was slow.

Management strategies: Continue to monitor the largemouth bass population using biennial sampling to evaluate the effectiveness of stockings of Florida largemouth bass fingerlings conducted in 1998 and 1999. Continue with standard monitoring using gill netting, electrofishing, and optional trap netting surveys in 2014-2015. Continue efforts to establish native vegetation to enhance aquatic habitat.

INTRODUCTION

This document is a summary of fisheries data collected from Lake Winnsboro from June 2010 through May 2011. Its purpose is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other species of fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2010-2011 data for comparison.

Reservoir Description

Lake Winnsboro is a 1,100-acre impoundment constructed in 1962 on Big Sandy Creek, a tributary of the Sabine River. It is located in Wood County, approximately 35 miles north of Tyler, Texas, and is operated and controlled by Wood County. Primary water uses include flood control and recreation. Habitat at time of sampling consisted of natural shoreline with aquatic cover provided by native emergent vegetation and piers and docks. Shoreline modification, consisting of bulkhead and rocky shoreline, accounts for approximately 5% of lakeshore. Boat access consists of three public boat ramps. Bank fishing access was present at all public boat ramps and along bridges in the upper end of the reservoir. Other descriptive characteristics for Lake Winnsboro are shown in Table 1.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Jubar and Storey 2007) included:

1. Enhancement of largemouth bass fishery.
   Action: Electrofishing surveys were conducted in 2008 and 2010 to monitor the largemouth bass population, and a genetics sample was obtained from young-of-year fish in fall 2008.
2. Supplemental sampling to verify presence of white crappie
   Action: Optional trap net sampling was conducted in fall 2010.
3. Increase awareness of Lake Winnsboro fisheries resources.
   Action: Lake Winnsboro has the potential for quality black crappie and channel catfish fishing. Informal promotion of the lake's fisheries resources was undertaken when anglers contacted the District office with inquiries about fishing smaller lakes in District 3B.

Harvest regulation history: Sport fishes in Lake Winnsboro are currently managed with statewide regulations (Table 2).

Stocking history: Lake Winnsboro was most recently stocked with Florida largemouth bass in 1999. Florida largemouth bass (FLMB) were initially introduced in 1974 (55,100 fingerlings) and stocked again in 1998 and 1999. Blue catfish were introduced in 1977 and stocked twice more, but the population did not establish itself as no blue catfish have been sampled during the past two decades. Channel catfish were introduced in 1982 and flathead catfish in 1977. Channel catfish were still present in the reservoir. The complete stocking history is shown in Table 3.

Vegetation/habitat history: In 2006, available shoreline habitat was limited due to low lake levels resulting from a statewide drought. Natural shoreline with standing timber accounted for 29% of the total shoreline distance, and boat docks contributed a further 7% (Jubar and Storey 2007).

Water Transfer: Lake Winnsboro is primarily used for recreation and flood control. There are no pump stations on the reservoir.

METHODS

Fishes were collected by electrofishing (1 hour at 12, 5-min stations), gill netting (5 net nights at 5 stations), and trap netting (5 net nights at 5 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing and for gill and trap nets as the number of fish caught per net night (fish/nn). All survey sites were randomly selected, and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2009). Aquatic vegetation, littoral habitat, and angler access surveys were performed according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2009).

Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distribution (PSD) as defined by Guy et al. (2007)], and condition indices [Relative Weights (W_r)] were calculated for target fishes according to Anderson and Neumann (1996). Index of Vulnerability (IOV) was calculated for gizzard shad (DiCenzo et al. 1996). Relative standard error (RSE = 100 X SE of the estimate/estimate) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV. Ages were determined using otoliths from largemouth bass (N=13, length range 13.1 to 14.9 inches) and black crappie (N=8, length range 10.3 to 11.2 inches) using fish from one inch class below to one inch class above the legal length limit. A sample of 30 age-0 largemouth bass was collected by electrofishing in fall 2008 and subjected to genetic analysis using DNA microsatellite analysis in accordance with Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2009).

RESULTS AND DISCUSSION

Vegetation/habitat: The shoreline in summer 2010 was primarily natural with approximately 5% modified with rock and bulkhead. Native emergent aquatic vegetation and piers/docks were the most common habitat features (Table 4). Aquatic vegetation in Lake Winnsboro is limited. Only 5 acres of combined species were observed during the vegetation survey, representing 0.5% of the lake's surface area. District staff initiated efforts to establish native aquatic vegetation in Lake Winnsboro in 2010 by planting waterwillow harvested from Lake Holbrook at five sites in the reservoir.

Prey species: Total CPUE of gizzard shad was higher (281.0/h) than in previous years (194.0/h, 184.0/h) and the population was dominated by fish less than 5 inches in length (Figure 1). Index of vulnerability (IOV) for gizzard shad was high, with 98% of gizzard shad available as prey to predators. Total CPUE of bluegill in 2010 (582.0/h) was also higher than in surveys conducted in 2002 (438.0/h) and 2006 (158.0/h). The population was dominated by fish less than 5 inches in length (Figure 2). Although redear sunfish are usually an important component of the sunfish community and have historically supported a popular fishery, CPUE in 2010 was much lower (3.0/h) than it was in previous years (2002, 128.0/h; 2006, 172.0/h) (Figure 3).

Channel catfish: Gill net surveys in the past have characterized the channel catfish population as one of low relative abundance. Historically, the majority of the fish collected were larger than the minimum length limit and few less than stock length (11 inches) were encountered, implying recruitment was limited. The gill net catch rate of channel catfish in 2011 (39.6/nn) was higher by a factor of ten than it was previous surveys (Figure 4). Relative weights of fish were good, and 26% of the fish collected were of legally-harvestable size. The sample also contained a sizeable component of fish less than stock length. This population has the potential to provide an excellent fishery. Although blue catfish were stocked in the past, there is no evidence the population ever established itself.

Largemouth bass: The largemouth bass population in 2010 exhibited a favorable size distribution with a PSD of 38, close to the lower end of the range (40-70) for a balanced fish population proposed by Gabelhouse (1984). Largemouth bass CPUE in 2010 (150.0/h) was between values observed in previous

surveys conducted in 2006 (47.0/h) when unusually low water levels resulted in poor habitat conditions and in 2008 (235.0/h) when improved habitat gave rise to improved recruitment (Figure 5). The 2010 largemouth bass electrofishing sample was dominated by fish below stock length (<8 inches) which accounted for 63% of the sample. Fish of legally-harvestable size (≥14 inches) comprised 9% of the sample. Growth of largemouth bass in Lake Winnsboro was good; average age at 14 inches (mean length=14.1 inches, 13.1 to 14.9 inches) was 2.6 years (N = 13; range = 2 – 4 years). Genetic assessment in fall 2008 yielded no pure FLMB, and the FLMB allele frequency was 28%, within the range observed in previous surveys (22%-42%) (Table 5).

Crappies: The trap net catch rates of white and black crappie in 2010 were low with a combined CPUE of 1.8/nn (Figure 6 and Figure 7). All crappie collected were of legally-harvestable size (≥10 inches). Growth of black crappie in Lake Winnsboro was slow; average age at 10 inches (mean length=10.8 inches, 10.3 to 11.2 inches) was 3.0 years (N = 8; all fish were 3 years old).

Fisheries management plan for Lake Winnsboro, Texas

Prepared – July 2011

ISSUE 1: Lake Winnsboro has shown the potential to produce trophy largemouth bass as evidenced by the size of the current lake record, 10.75 pounds (3/2004). Florida largemouth bass were last stocked in 1998 and 1999.

MANAGEMENT STRATEGIES

1. Conduct additional electrofishing survey during fall 2012 and standard sampling in fall 2014 to monitor the largemouth bass population.
2. Conduct genetic analysis of fish collected during fall 2012 electrofishing to determine FLMB component of the population.
3. If sufficient information can be compiled to substantiate the potential for large (>7 pounds) fish production, request stocking of FLMB at 100/acre.

ISSUE 2 Aquatic vegetation is limited to emergent vegetation, primarily giant cutgrass. In summer 2010, waterwillow was planted in five selected sites throughout the reservoir. In the future, attempts will be made to enhance existing colonies and establish new sites. Additional native aquatic plant species will be introduced to further diversify the aquatic vegetation community and enhance fish habitat.

MANAGEMENT STRATEGIES

1. Evaluate the growth of waterwillow at planting sites in summer 2011.
2. Augment existing sites with supplemental plantings and establish colonies in new sites. Source plants will be harvested from Lake Holbrook.
3. Request plants from the Native Aquatic Plant Nursery at the Texas Freshwater Fisheries Center to increase plant diversity and enhance fish habitat in Lake Winnsboro.

ISSUE 3: Population sampling indicates quality largemouth bass and channel catfish fisheries at Lake Winnsboro. Close proximity to Lake Fork Reservoir and other Wood County lakes; however, may limit fishery exposure.

MANAGEMENT STRATEGIES

1. Promote the fisheries resources of Lake Winnsboro through local media and other outlets.

ISSUE 4: Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels (*Dreissena polymorpha*) can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches, and plugging engine cooling systems. Giant Salvinia (*Salvinia molesta*) and other invasive vegetation species can form dense mats, interfering with recreational activities like fishing, boating, skiing, and swimming. The financial costs of controlling and/or eradicating these types of invasive species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

MANAGEMENT STRATEGIES

1. Cooperate with the controlling authority to post appropriate signage at access points around the reservoir.
2. Contact and educate marina owners about invasive species and provide them with posters, literature, etc. so that they can in turn educate their customers.

3. Educate the public about invasive species through the use of media and the Internet.
4. Make a speaking point about invasive species when presenting to constituent and user groups.
5. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential invasive species responses.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes additional largemouth bass-only electrofishing in 2012 and mandatory monitoring in 2014-2015 (Table 6). The additional electrofishing survey in 2012 is necessary to maintain consistent data for trend information on the largemouth bass population and to collect a genetics sample. Gill net and trap net surveys are only necessary every four years to monitor channel catfish and crappie recruitment, condition, and relative abundance.

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Table 1. Characteristics of Lake Winnsboro, Texas.

Characteristic	Description
Year constructed	1962
Controlling authority	Wood County
Surface area	1,100 acres
Counties	Wood
Reservoir type	Tributary
Mean depth	11.0 ft.
Maximum depth	23.0 ft.
Shoreline development index (SDI)	N/A
Conductivity	110 µmho / cm
Secchi disc range	2 – 4 ft.
Watershed area	27 mi^2

Table 2. Harvest regulations for Lake Winnsboro.

Species	Bag limit	Minimum-Maximum length (inches)
Catfish, channel and blue catfish, their hybrids and subspecies	25 (in any combination)	12 - No limit
Catfish, flathead	5	18 - No limit
Bass, largemouth	5	14 - No limit
Crappie, white and black crappie, their hybrids and subspecies	25 (in any combination)	10 - No limit

Table 3. Stocking history of Lake Winnsboro, Texas. Size categories: FGL = 1-3 inches, AFGL = 8 inches, and ADL = adults.

Species	Year	Number	Size
Blue catfish	1977	11,000	
	1979	10,990	
	1981	16,000	FGL
	Total	37,990	
Channel catfish	1982	300	
	1992	11,028	AFGL
	Total	11,328	
Flathead catfish	1977	700	
	Total	700	
Florida largemouth bass	1974	55,100	FGL
	1998	110,423	FGL
	1999	118,218	FGL
	Total	283,741	

Table 4. Survey of littoral zone and physical habitat types, Lake Winnsboro, Texas, July 2010. A linear shoreline distance (miles) was recorded for each habitat type found. The sum of shoreline distances exceeds the lake perimeter because of overlap of habitat types.

Shoreline habitat type / Aquatic vegetation species	Shoreline Distance		Surface Area	
	Miles	Percent of total	Acres	Percent of reservoir surface area
Bulkhead	0.18	1.05		
Bulkhead/ piers & docks	0.19	1.07		
Bulkhead/ piers & docks/ native emergent	0.05	0.28		
Natural shoreline	0.11	0.65		
Natural shoreline/ alligatorweed	0.13	0.74		
Natural shoreline/ native emergent	11.94	68.80		
Natural shoreline/ native emergent/ Alligatorweed	1.09	6.25		
Natural shoreline/ native emergent/ alligatorweed/ piers & docks	0.12	0.70		
Natural shoreline/ native emergent/ piers & docks	1.87	10.76		
Natural shoreline/ piers & docks	1.33	7.66		
rocky shoreline	0.35	2.01		
Total	17.36			
Native emergent aquatic species *(buttonbush, maidencane, smartweed, giant cutgrass)*			1.5	0.1
Alligatorweed and native emergents			2.9	0.3
Alligatorweed			0.9	0.1
Total			5.3	0.5

Gizzard shad

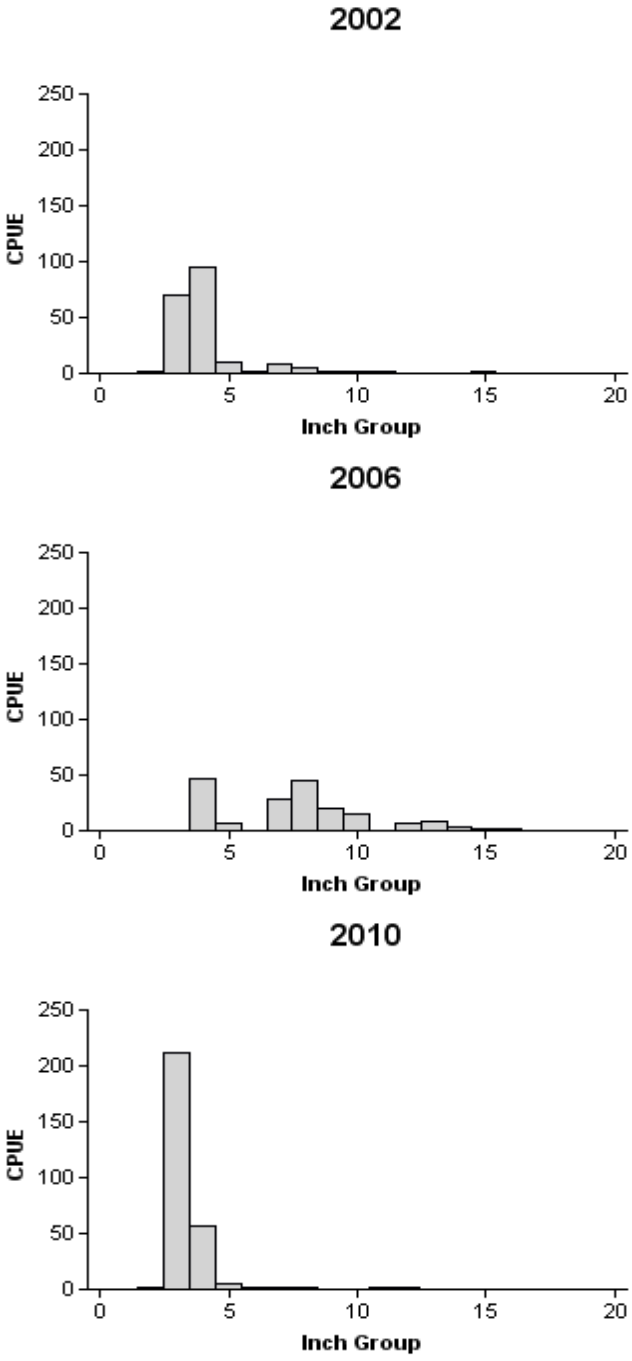


Figure 1. Number of gizzard shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Lake Winnsboro, Texas, 2002, 2006, and 2010.

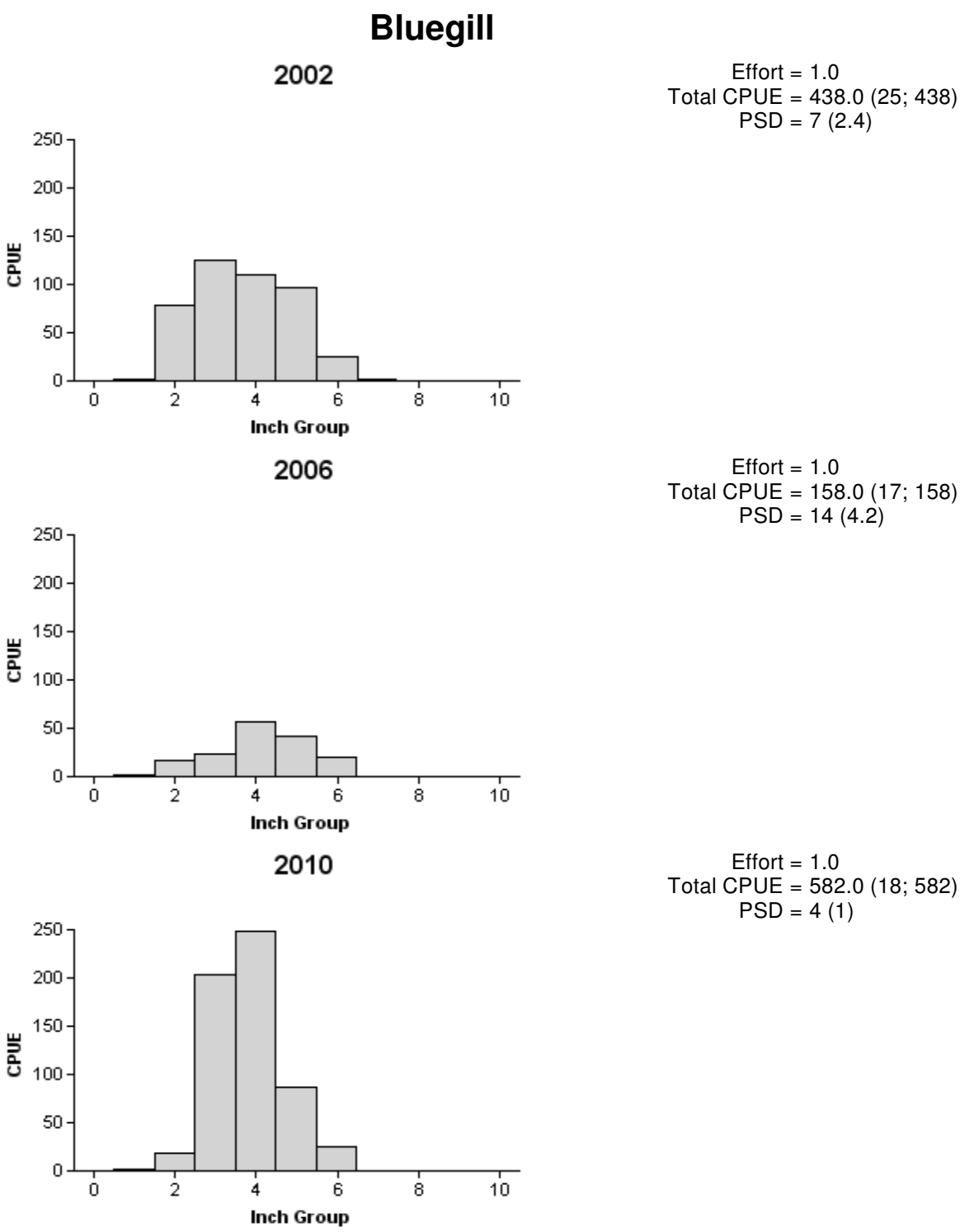


Figure 2. Number of bluegill caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Winnsboro, Texas, 2002, 2006, and 2010.

Redear sunfish

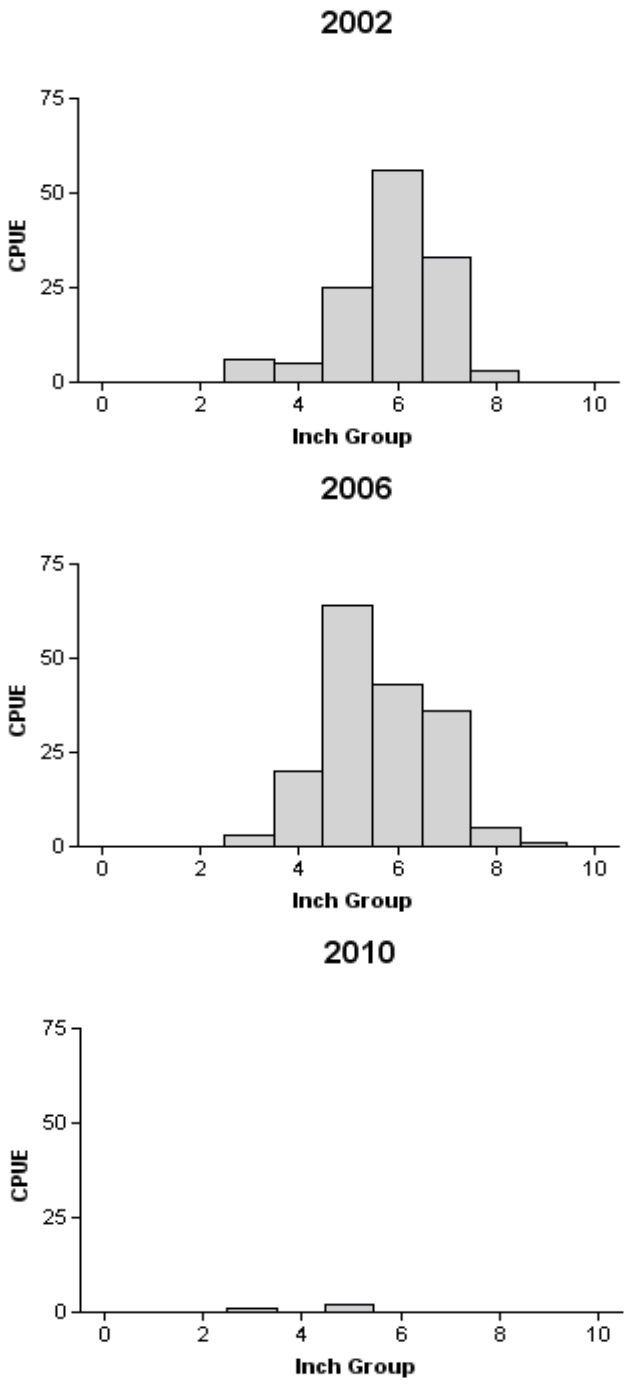


Figure 3. Number of redear sunfish caught per hour (CPUE, bars) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Winnsboro, Texas, 2002, 2006, and 2010.

Channel catfish

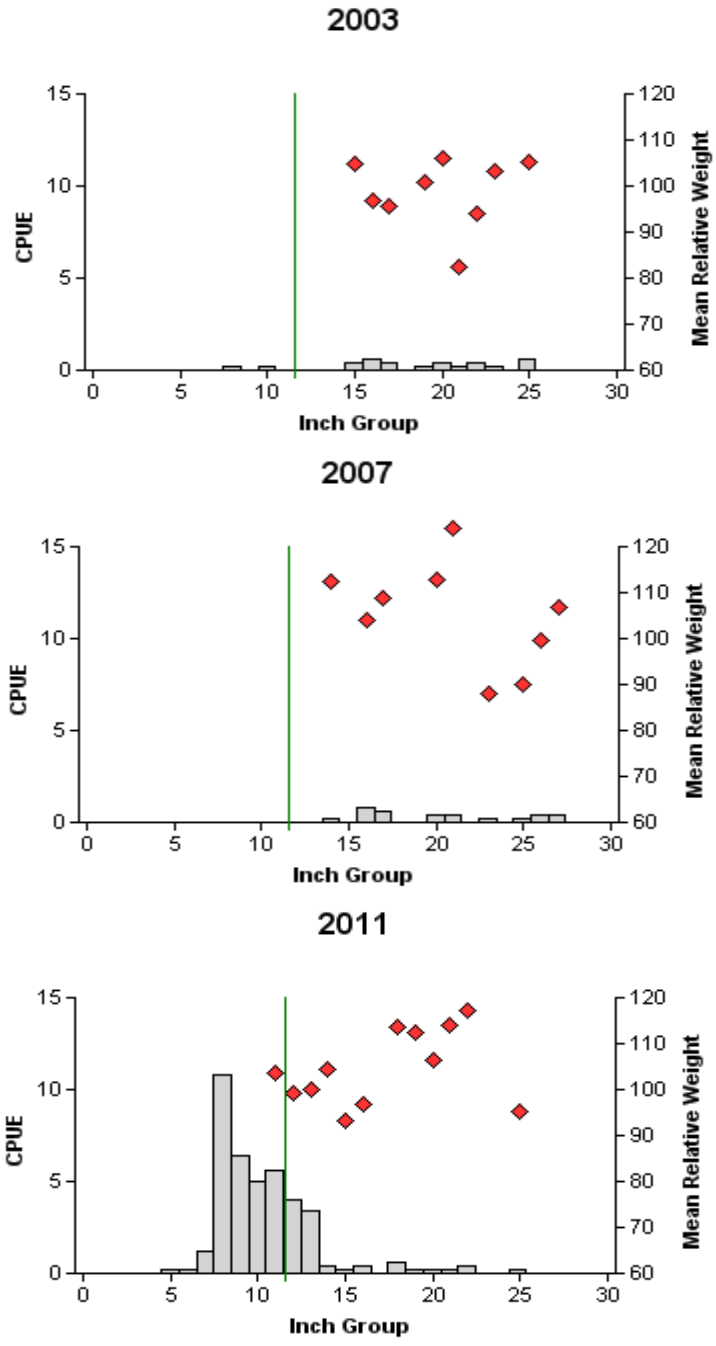


Figure 4. Number of channel catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Lake Winnsboro, Texas, 2003, 2007, and 2011. Vertical lines indicate minimum length limit at time of survey.

Largemouth bass

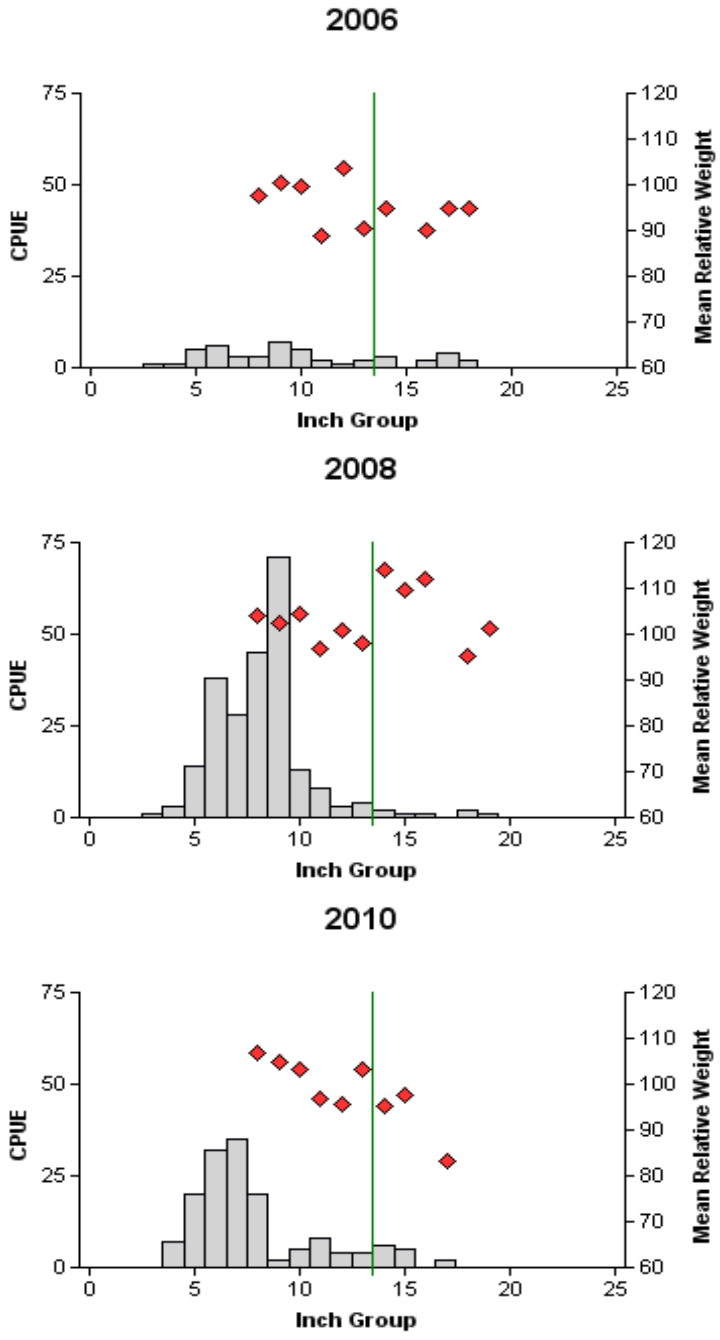


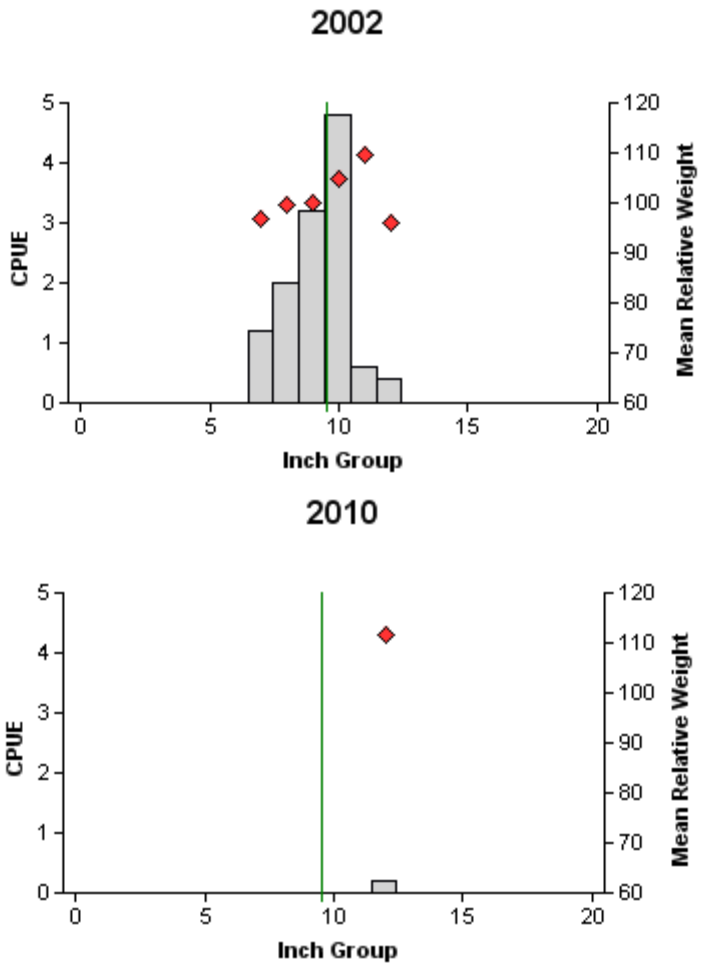
Figure 5. Number of largemouth bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Lake Winnsboro, Texas, 2006, 2008, and 2010. The 2008 survey was bass-only. Vertical lines indicate minimum length limit at time of survey.

Table 5. Results of genetic analysis of largemouth bass collected by fall electrofishing, Lake Winnsboro, Texas, 1989, 1993, 1996, 1999, 2002, 2006, and 2008. FLMB = Florida largemouth bass, NLMB = Northern largemouth bass, F1 = first generation hybrid between a FLMB and a NLMB, Fx = second or higher generation hybrid between a FLMB and a NLMB. Since 2006 analyses have been conducted using DNA microsatellite analysis. Prior to that time starch gel electrophoresis was employed.

		Genotype						
Year	Sample size	FLMB	F1	Fx	Combined hybrids	NLMB	% FLMB alleles	% pure FLMB
1989	30	1	5	15	20	9	34.2	3.3
1993	35	0	8	18	26	9	30.0	0.0
1996	35	2	8	19	27	6	42.1	5.7
1999	30	0	5	14	19	11	21.7	0.0
2002	27	1	4	9	13	13	24.6	3.7
2006	13	0	[a]	[a]	11	2	30.0	0.0
2008	30	0	0	28	28	2	28.0	0.0

[a]Analysis did not separate F1 and Fx hybrids

White crappie



Effort = 5.0
Total CPUE = 12.2 (76; 61)
Stock CPUE = 12.2 (76; 61)
PSD = 90 (2.6)
PSD-P = 48 (4)

Effort = 5.0
Total CPUE = 0.2 (100; 1)
Stock CPUE = 0.2 (100; 1)
PSD = 100 (0)
PSD-P = 100 (0)

Figure 6. Number of white crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Lake Winnsboro, Texas, 2002 and 2010. No white crappie were collected in 2006. Vertical lines indicate minimum length limit at time of survey.

Black crappie

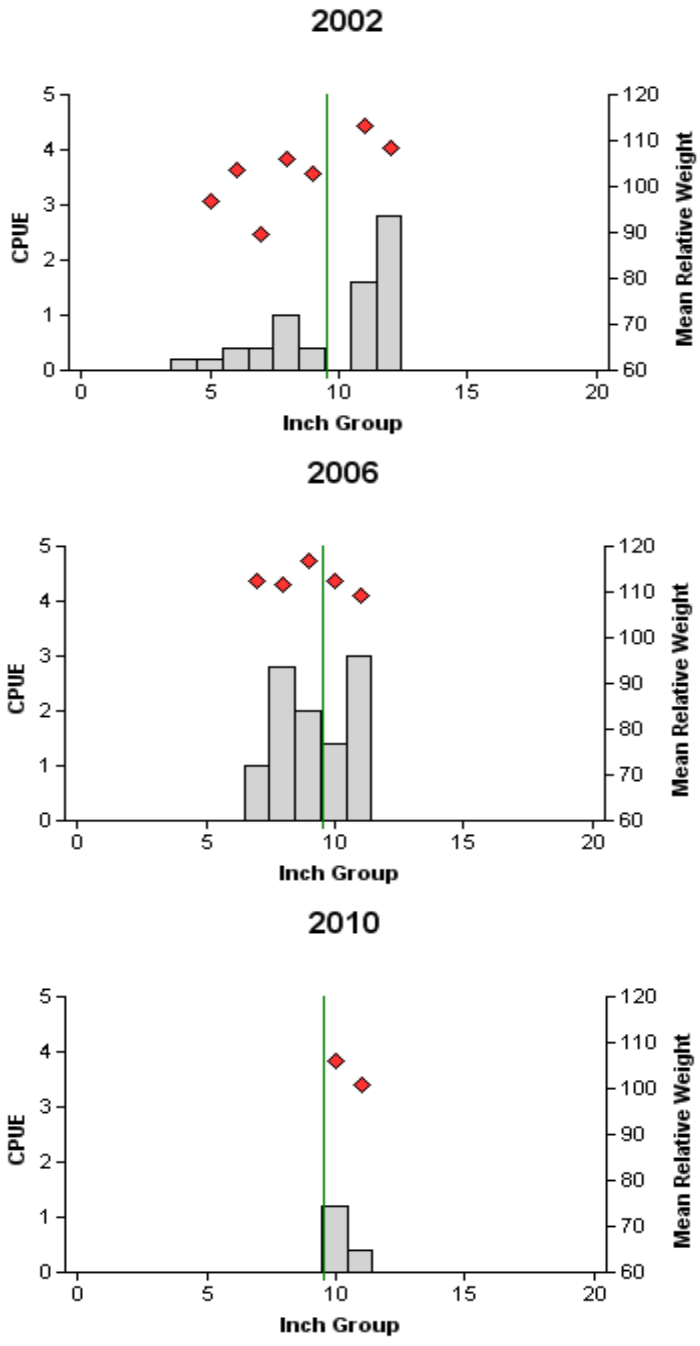


Figure 7. Number of black crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap net surveys, Lake Winnsboro, Texas, 2002, 2006, and 2010. Vertical lines indicate minimum length limit at time of survey.

Table 6. Proposed sampling schedule for Lake Winnsboro, Texas. Gill netting surveys are conducted in the spring while electrofishing and trap netting surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

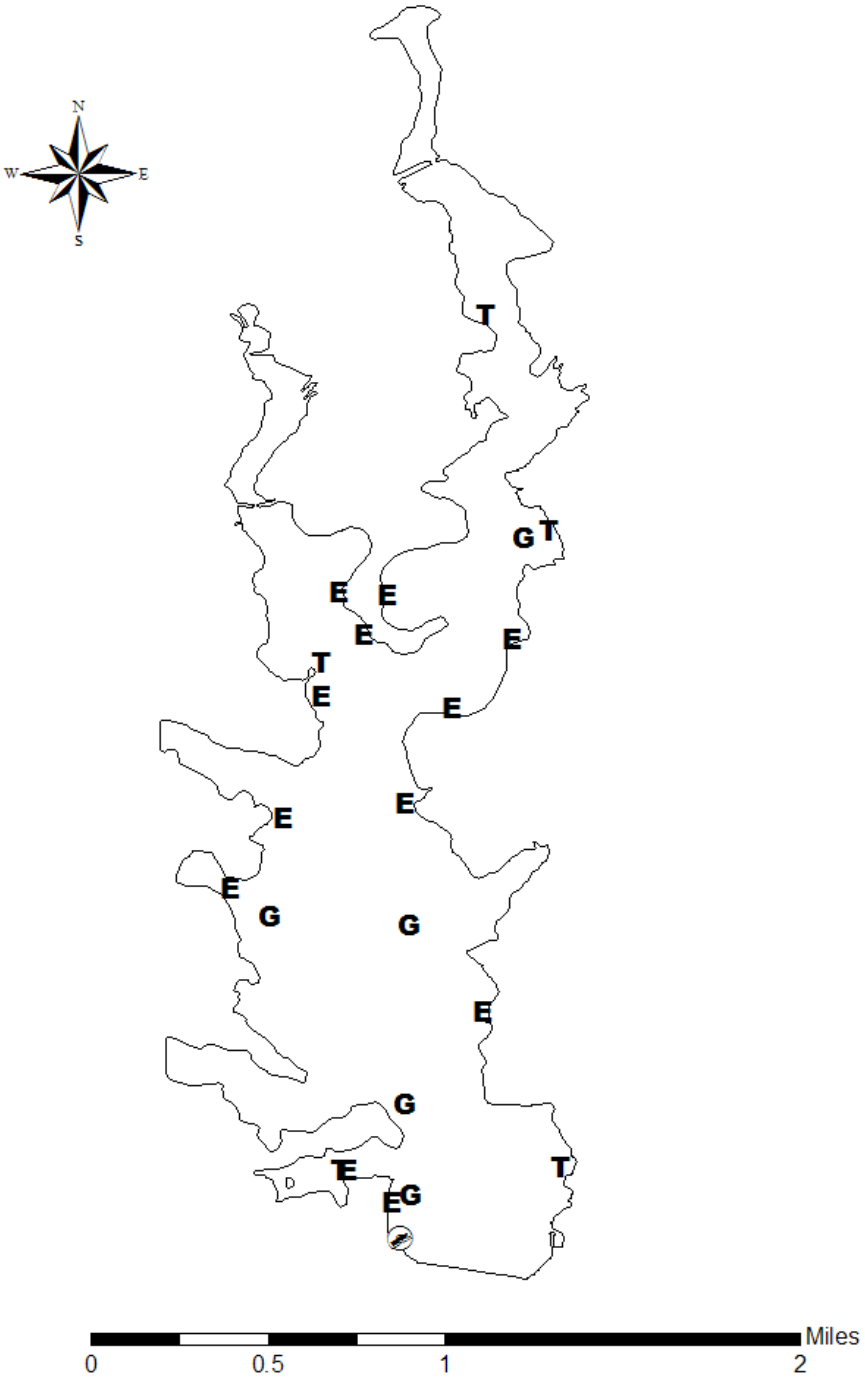
Survey Year	Electrofishing	Trap netting	Gill netting	Creel	Vegetation/ Habitat	Access	Report
Summer 2012-Spring 2013	A						
Summer 2014-Spring 2015	S	A	S	A	S	S	S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Lake Winnsboro, Texas, 2010-2011.

Species	Gill Netting		Trap Netting		Electrofishing	
	N	CPUE	N	CPUE	N	CPUE
Gizzard shad					281	281.0
Threadfin shad					41	41.0
Channel catfish	198	39.6				
Warmouth					2	2.0
Bluegill					582	582.0
Longear sunfish					76	76.0
Redear sunfish					3	3.0
Largemouth bass					150	150.0
White crappie			1	0.2		
Black crappie			8	1.6		

APPENDIX B



Location of electrofishing (E), gill netting (G), and trap netting (T) sites Lake Winnsboro, Texas, 2010-2011.